

WHAT IS CLAIMED IS:

1. A suture securing apparatus comprising:
an apparatus body having an upper surface, a lower surface, an outer surface, and at least one aperture,
the aperture having a longitudinal axis extending from the upper surface to the lower surface and defining an aperture surface, wherein a first longitudinal direction and a second longitudinal direction thereof each extends along the longitudinal axis in opposite directions, the aperture including an integral locking means for engaging a suture threaded therethrough.
2. The suture securing apparatus according to claim 1, wherein the locking means comprises a least one ridge formed on at least a portion of the aperture surface for engaging the suture threaded therethrough, each ridge so formed as to facilitate the movement of a suture in the first longitudinal direction along the aperture and oppose the movement of the suture in the second longitudinal direction along the aperture.
3. The suture securing apparatus according to claim 2, wherein the locking means comprises a plurality of ridges formed on at least a portion of the aperture surface for engaging the suture threaded therethrough, each ridge so formed as to facilitate the movement of a suture in the first longitudinal direction along the aperture and oppose the movement of the suture in the second longitudinal direction along the aperture.
4. The suture securing apparatus according to claim 2, wherein each ridge is formed from an elastic material.
5. The suture securing apparatus according to claim 2, wherein each ridge is formed from a rigid material.

6. The suture securing apparatus according to claim 2, wherein the portion of each ridge extending farthest from the aperture surface is rounded.

7. The suture securing apparatus according to claim 2, wherein each ridge is formed at an angle of greater than about 30° to the longitudinal axis of the aperture.

8. The suture securing apparatus according to claim 7, wherein each ridge is formed at an angle of about 45° to the longitudinal axis of the aperture.

Sub A 39. The suture securing apparatus according to claim 2, the apparatus body comprising a first aperture and a second aperture, wherein each ridge formed on the first aperture surface is so formed as to facilitate the movement of a suture in the first longitudinal direction along the first aperture and oppose the movement of the suture in the second longitudinal direction along the first aperture and wherein each ridge formed on the second aperture surface is so formed as to facilitate the movement of a suture in the first longitudinal direction along the second aperture and oppose the movement of the suture in the second longitudinal direction along the second aperture, wherein the first longitudinal direction along the first aperture and the first longitudinal direction along the second aperture are directed to the upper surface of the apparatus body.

10. The suture securing apparatus according to claim 9, wherein the first and second apertures are mirror images of each other, as defined by a mirror plane equidistant from them.

Sub A 41. The suture securing apparatus according to claim 2, the apparatus body comprising a first aperture and a second aperture, wherein each ridge formed on the first aperture surface is so formed as to facilitate the movement of a suture in the first longitudinal direction along the first aperture and oppose the movement of the suture in the second longitudinal direction along the first aperture and wherein each ridge formed on the second aperture surface is so formed as to facilitate the movement of a suture in the first longitudinal direction along the second aperture and oppose the movement of the suture in the second longitudinal direction along the second aperture, wherein

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the first longitudinal direction ~~along the first aperture~~ and the second longitudinal direction along the second aperture are directed to the upper surface of the apparatus body.

a 12. The suture securing apparatus according to claim ~~2~~¹, wherein the suture securing apparatus is made from biocompatible materials.

13. The suture securing apparatus according to claim 2, wherein the suture securing apparatus is made from biodegradable materials.

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14. A suture securing apparatus comprising:

(a) an apparatus body having an upper surface, a lower surface, an outer surface, and at least one aperture, the aperture having a longitudinal axis extending from the upper surface to the lower surface and defining an aperture surface, wherein a first longitudinal direction and a second longitudinal direction thereof each extends along the longitudinal axis in opposite directions,

the aperture consisting of an upper portion, a middle portion, and a lower portion, the upper portion bounded by the upper surface of the apparatus body and the middle portion, the middle portion bounded by the upper portion and the lower portion, and the lower portion bounded by the middle portion and the lower surface of the apparatus body, wherein the middle portion has a first surface and second surface opposing each other and is wider than either of the upper portion and the lower portion and forms a cavity therein; and

(b) a movable cam member disposed in the middle portion of the aperture, the cam member having an engagement end and a rotation end, the rotation end being wider than the width of the upper portion of the aperture thereof and the width of the lower portion of the aperture thereof and disposed near the second surface, and the engagement end disposed near the first surface;

wherein the cam member moves to an unengaged position to facilitate the movement of a suture threaded through the aperture in the first longitudinal direction along the aperture and moves to an engaged position to engage the suture threaded through the aperture in

the second longitudinal direction by compressing the suture between the engagement end of the cam member and the first surface of the middle aperture to oppose the movement of the suture in the second longitudinal direction along the aperture.

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15. The suture securing apparatus according to claim ¹³14, wherein the first surface of the middle aperture comprises at least one ridge, each ridge so formed as to facilitate the movement of a suture in the first longitudinal direction along the aperture and oppose the movement of the suture in the second longitudinal direction along the aperture.

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16. The suture securing apparatus according to claim ¹³14, wherein the first surface of the middle aperture comprises a plurality of ridges, each ridge so formed as to facilitate the movement of a suture in the first longitudinal direction along the aperture and oppose the movement of the suture in the second longitudinal direction along the aperture.

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17. The suture securing apparatus according to claim ¹³14, wherein each ridge is formed from an elastic material.

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18. The suture securing apparatus according to claim ¹³14, wherein each ridge is formed from a rigid material.

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19. The suture securing apparatus according to claim ¹³14, wherein the engagement end of the cam member comprises serrations to grip the suture when engaged.

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20. The suture securing apparatus according to claim ¹³14, the apparatus body including a first aperture with a first movable cam member therein and a second aperture with a second movable cam member therein,

wherein the first movable cam member moves to an unengaged position to facilitate the movement of a suture threaded through the first aperture in the first longitudinal direction along the aperture and moves to an engaged position to engage the suture threaded through the

first aperture in the second longitudinal direction by compressing the suture between the engagement end of the first movable cam member and the first surface of the middle aperture thereof to oppose the movement of the suture in a second longitudinal direction along the first aperture;

wherein the second movable cam member moves to an unengaged position to facilitate the movement of a suture threaded through the second aperture in the first longitudinal direction along the second aperture and moves to an engaged position to engage the suture threaded through the second aperture in the second longitudinal direction by compressing the suture between the engagement end of the first movable cam member and the first surface of the middle aperture thereof to oppose the movement of the suture in a second longitudinal direction along the second aperture; and

wherein the first longitudinal direction along the first aperture and the first longitudinal direction along the second aperture are both directed to the upper surface of the apparatus body.

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21. The suture securing apparatus according to claim 19, wherein the first and second apertures and first and second cam members are mirror images of each other, as defined by a mirror plane equidistant from them.

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22. The suture securing apparatus according to claim 13, the apparatus body including a first aperture with a first movable cam member therein and a second aperture with a second movable cam member therein,

wherein the first movable cam member moves to an unengaged position to facilitate the movement of a suture threaded through the first aperture in the first longitudinal direction along the aperture and moves to an engaged position to engage the suture threaded through the first aperture in the second longitudinal direction by compressing the suture between the engagement end of the first movable cam member and the first surface of the middle aperture thereof to oppose the movement of the suture in a second longitudinal direction along the first aperture;

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wherein the second movable cam member moves to an unengaged position to facilitate the movement of a suture threaded through the second aperture in the first longitudinal direction along the second aperture and moves to an engaged position to engage the suture threaded through the second aperture in the second longitudinal direction by compressing the suture between the engagement end of the first movable cam member and the first surface of the middle aperture thereof to oppose the movement of the suture in a second longitudinal direction along the second aperture; and

wherein the first longitudinal direction along the first aperture and the second longitudinal direction along the second aperture are both directed to the upper surface of the apparatus body.

23. The suture securing apparatus according to claim 13, wherein the suture securing apparatus is made from biocompatible materials.

24. The suture securing apparatus according to claim 13, wherein the suture securing apparatus is made from biodegradable materials.

25. A securable medical prosthesis device comprising a medical prosthesis device in physical contact with at least one suture securing apparatus according to claim 2.

26. A securable medical prosthesis device comprising a medical prosthesis device in physical engagement with at least one suture securing apparatus according to claim 2.

27. A securable medical prosthesis device comprising a medical prosthesis device integrally formed with at least one suture securing apparatus according to claim 2.

28. The securable medical device according to claim 23, wherein the medical prosthesis device is a sewing ring implant shaped and sized for attachment to the inner surface of a native annulus,

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the sewing ring implant having a plurality of suture securing apparatuses distributed around the circumference of the sewing ring implant.

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~~29.~~ A securable medical prosthesis device comprising a medical prosthesis device in physical contact with at least one suture securing apparatus according to claim ¹³~~14~~.

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~~30.~~ A securable medical prosthesis device comprising a medical prosthesis device in physical engagement with at least one suture securing apparatus according to claim ¹³~~14~~.

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~~31.~~ A securable medical prosthesis device comprising a medical prosthesis device integrally formed with at least one suture securing apparatus according to claim ¹³~~14~~.

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~~32.~~ A securable medical device according to claim ²⁹~~30~~, wherein the medical prosthesis device is a sewing ring implant shaped and sized for attachment to the inner surface of a native annulus, the sewing ring implant having a plurality of suture securing apparatuses distributed around the circumference of the sewing ring implant.

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~~33.~~ A suture securing apparatus comprising:

an apparatus body having a upper surface, a lower surface, an outer surface, a first aperture, and a second aperture, the first longitudinal direction of each aperture each being directed to the upper surface of the apparatus body,

wherein each ridge formed on the first aperture surface and second aperture surface is so formed as to facilitate the movement of a suture in the first longitudinal direction and oppose the movement of the suture in the second longitudinal direction, each ridge is formed at an angle of about 45° to the longitudinal axis of the respective aperture, and the portion of each ridge extending farthest from the aperture surface is rounded, and

wherein the first and second apertures are mirror images of each other, as defined by a mirror plane equidistant from them.

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A suture securing apparatus comprising:

an apparatus body having an upper surface, a lower surface, an outer surface, and the apparatus body including a first aperture with a first movable cam member therein and a second aperture with a second movable cam member therein, the first longitudinal direction of each aperture each being directed to the upper surface of the apparatus body,

wherein the first movable cam member and second movable cam member each moves to an unengaged position to facilitate the movement of a suture threaded through the respective aperture in the first longitudinal direction along the aperture and moves to an engaged position to engage the suture threaded through the respective aperture in the second longitudinal direction by compressing the suture between the engagement end of the respective movable cam member and the first surface of the middle aperture thereof to oppose the movement of the suture in a second longitudinal direction along the respective aperture; and

wherein the first and second apertures and first and second cam members are mirror images of each other, as defined by a mirror plane equidistant from them.

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